

Botanical Gazette.

Vol. VI.

AUGUST, 1881.

No. 8.

Editorial.—THE EDITOR OF THIS JOURNAL will be absent during the month of August. This announcement is not to discourage correspondence, but to account for any delay in answering it. All communications can be sent as heretofore, and contributions to the September number must be in hand on or before August 25.

THE PELLUCID STEMS OF *Pilea pumila* yield as rich and easy results to the microscopic anatomist as any plant I know of, hardly excepting the universally useful pumpkin vine. The stems are already translucent and when hardened by alcohol are remarkably easy to get perfectly transparent sections from. The single row of epidermal cells, the frequent section views of stomata, the typical collenchyma and under it the cambium, and then about a dozen perfectly top-shaped fibro-vascular bundles, all come out so clearly that even a beginner can demonstrate them with but little difficulty. My pickle jar is full of it now and a glimpse of one or two sieve plates has encouraged me to look farther. I mention all this because so universally abundant a thing as *Pilea* can easily be "pickled" for fall and winter use in the laboratory.

MR. A. H. CURTISS, of Jacksonville, Fla., has his second fascicle of Southern Ferns ready for distribution, and also a second issue of the first fascicle mostly collected in different localities. The second fascicle is mailed to subscribers for \$1.50; the first for \$1.25; 25 cents off on extra sets in one package.

The new fascicle contains *Pteris longifolia*, *P. Cretica*, *P. serrulata*, *P. aquilina*, var. from Cape Sable, *Adiantum Capillus-Veneris*, *Asplenium parvulum*, *A. dentatum*, *A. firmum*, *A. myriophyllum*, *Aspidium trifoliatum*, *Ancimia adiantifolia*. All of these are root specimens.

The reissue of the first fascicle contains *Acrostichum aureum*, *Polypodium aureum*, *Blechnum serrulatum* and *Aspidium unitum*, var. *glabrum* from the Caloosahatchie; *Polypodium pectinatum*, from Daytona; *Polypodium Phyllitidis* and *Vittaria lineata* from forests bordering the Everglades; *Aspidium patens* and *Nephrolepis exaltata* from near Tampa; *Cheilanthes microphylla* and *Aspidium Floridanum* from the St. John's River.

PROF. A. F. W. SCHIMPER, of Johns Hopkins University, in the July *Naturalist* gives a brief account of the results of his recent investigations upon the growth of starch grains. The theory of Nageli has been generally accepted and intussusception has been taught in our class rooms with considerable confidence. The investigations of Prof. Schimper, however, reveal certain facts which can by no means be

reconciled with the prevailing theory. In the first place it is found that the middle part of starch grains is first formed and the outer parts deposited around it. This is proved from the fact that the corroded surface of young grains is seen within older ones, covered up by subsequent deposits. The main strength of Nageli's theory, however, lies in the fact of the appearance in the starch grains of alternating layers of more and less watery substance, giving the appearance of concentric lines about the nucleus; also that young grains by no means resemble the center of old ones, for the latter are very watery and the former very dense; also that growth in different directions is unequal; and the growth of compound grains is strongest between the nuclei, whereas growth by apposition would be greater at the periphery. Prof. Schimper thinks that these appearances do not necessarily prove growth by intussusception, but can be explained by certain properties of starch grains. These properties are stated as follows: "(1) Starch grains are rather brittle parallel to the layers, but very extensible perpendicularly to them. (2) Cutting, crushing or extension causes the dense starch substance to swell up considerably and to take all the properties of the more watery parts of intact grains. (3) Swelling up in water is much stronger parallel to the layers than perpendicularly to them." Nageli recognizes tension, but thinks it due to the intercalation of starch molecules being greater in one direction than another. Prof. Schimper says the tension is due simply to the unequal swelling in different directions and that the starch substance would be extended, not broken, and hence would become more watery and less refractive. Therefore wherever the tension is greatest the less watery substance will appear more watery. The tension would naturally be greatest at the central part of the grain and the middle part of the layers.

The unequal growth of starch grains is explained by the unequal conveyance of material. Starch grains have central nuclei whenever they are completely imbedded in chlorophyll granules. When they are formed at the edge of these granules they become eccentric. The formation of compound grains is thought to be due to the growing together of free granules and not to division of simple grains, as Nageli holds.

Lilium Grayi.—I think not more than half a dozen plants of this species have so far been found. Mr. Watson regards it as a good species. Dr. Gray, in a letter to the writer, believes it will not be found specifically distinct from *L. Canadense*. On Roan Mountain last year the writer saw a plant from which the flower had been eaten by a cow, while on the stage ascending the mountain, but on returning next day could not find it again. Subsequently Prof. Porter found one in fruit, kindly dividing it, the living root to the writer, and the top for his herbarium. This root, having been dug up before mature, had but a single instead of two flowers as last year, but afforded a chance for continuous observation. The perianth is so short and broad that the first impression is that of a *Fritillaria*. If *Lilium Canadense* was not